Unit Cooperative Agreement No: 14-48-0001-95735 JAN 11

A Comparative Analysis of the Klamath River Basin Ecosystem—GIS and Technical Support for the Klamath River Basin Fisheries Task Force and Technical Work Group, Phase IV

98-PC-01

A Report to the U.S. Fish and Wildlife Service

Cooperators:

HSU Foundation
Humboldt State University
P.O. Box 1185
Arcata, CA 95521

U.S. Fish and Wildlife Service
Klamath River Fish and Wildlife Office
P.O. Box 1006
Yreka, CA 96097

Principal Investigator: Dr. Steven A. Carlson
College of Natural Resources and Sciences
Humboldt State University
Arcata, CA 95521

Project Officer: Dr. Ronald Iverson
Project Manager: John Hamilton
U.S. Fish and Wildlife Service
Klamath River Fish and Wildlife Office

Prepared by: Van Hare, GIS Analyst
Spatial Analysis Lab
College of Natural Resources and Sciences
Humboldt State University
Arcata, CA 95521

December 1998

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BACKGROUND

The Klamath Act of 1986 (16 U.S.C. 460 et seq.) established the Klamath River Basin Conservation Area Restoration Program, a 20-year fishery restoration program for the Klamath River Basin of northern California and southern Oregon (Figure 1). An advisory committee, the Klamath River Basin Fisheries Task Force was established by the Klamath Act to provide guidance in planning and implementing the Restoration Program. The Technical Work Group is comprised of representatives from the Task Force entities (appointed by their Task Force representative) who provide technical support and make recommendations to decision makers regarding the biological needs of anadromous fish.

In 1994 the Task Force Technical Work Group (TWG) contracted with the Humboldt State University Foundation (Unit Cooperative Agreement No: 14-0009-1547; Research Work Order No: 38) to assemble and develop Geographic Information System (GIS) digital data layers to support fisheries restoration planning in the Klamath River Basin.

After the completion of Research Work Order 38, the TWG recognized the need for continued GIS technical, logistic and planning support. In Fiscal Years 1996-1998 the U.S. Fish and Wildlife Service (USFWS) contracted with the Humboldt State University Foundation to provide the TWG with a Research Assistant. The focus of the Research Assistant position has been to provide map layers and fishery restoration data to assist the Task Force and TWG in reviewing past restoration efforts and prioritizing ongoing fishery restoration within the Klamath River Basin.

INTRODUCTION

Funding made available through Cooperative Agreement No: 14-48-0001-95735 was used to continue providing the Task Force and the TWG with GIS technical and planning support for fiscal year 1998. Project funding was used to meet the following objectives:

A. To continue to provide map layers, fishery restoration data, spreadsheets and other products that assist the Klamath River Basin Fisheries Task Force (KRBFTF), Technical Work Group (TWG), and the U.S. Fish and Wildlife Service-Klamath River Fish and Wildlife Office (USFWS) in reviewing past restoration efforts and prioritizing ongoing fishery restoration within the Klamath River Basin.

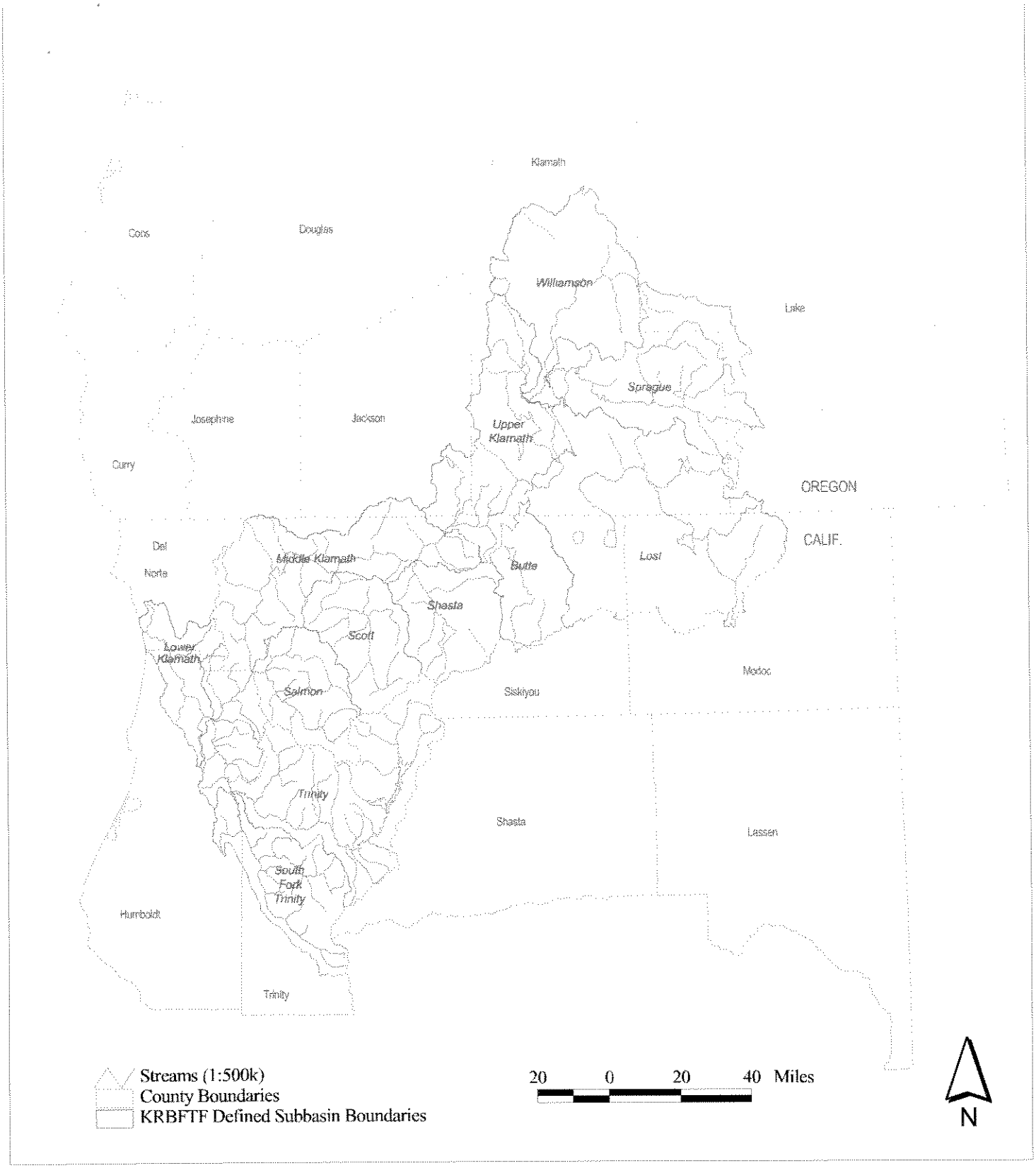


Figure 1. The Klamath River Basin (Northern California - Southern Oregon)

B. To continue to work with the KRBFTF, TWG and the USFWS Klamath River Fish and Wildlife Office in analyzing and disseminating information related to Klamath River Basin fish habitat and fish restoration projects.

C. To continue to provide general support and documentation of TWG activities.

D. To coordinate and cooperate in the acquisition and dissemination of geographic information among cooperating entities. This includes providing general GIS support to Coordinated Resource Management Planning (CRMP) efforts in various subbasins of the Klamath Basin and GIS orientation workshops and limited training.

E. To support the KRBFTF, USFWS, and TWG in the coordination of subbasin restoration plans for the Klamath River Basin.

METHODS AND MATERIALS

In FY 98, the TWG Research Assistant focused on providing GIS and technical support for subbasin planning and flow study scoping efforts. Support was provided through ongoing participation and documentation of TWG meetings and associated subcommittees. By January of 1998, it became apparent that documentation of the TWG flow study scoping process was demanding a disproportionate amount of the Research Assistant's time, leaving little time for GIS research, data development or subbasin planning efforts. As a result, at the January 13-15, 1998 TWG meeting in Redding, the TWG vowed to cease using the Research Assistant for meeting documentation purposes. The following section provides a list of the meetings that were attended and documented by the Research Assistant in FY98. Full meeting notes for Technical Work Group and subcommittee meetings are on file at the U.S. Fish and Wildlife Service (USFWS), Klamath River Fish and Wildlife Office (KRFWO) in Yreka.

Technical Work Group Meetings (primarily flow study scoping):

1. September 29-October 1st, 1997. Ashland Hills Inn, Ashland, Oregon
2. October 27-29, 1997. Ashland Hills Inn, Ashland, Oregon
3. November 18-20, 1997. BLM Conference Room, Arcata, California
4. December 2-4, 1997. USFWS Forensics Lab, Ashland, Oregon
5. January 13-15, 1998. CDF&G Conference Room, Redding, California

Subbasin Planning Subcommittee Meetings:

1. August 19, 1997. Humboldt State University, Arcata, CA. Mapping Needs Meeting.
2. September 23-24, 1997. Salmon River Restoration Council Office, Sawyer's Bar, CA.
3. January 6, 1998. Karuk Tribe of California, Natural Resources Office, Orleans, CA

RESULTS AND DISCUSSION

The following section addresses the tasks identified in the scope of work, including accomplishments and any problems that were encountered.

Task 1. *To continue to provide GIS research and mapping products required by the TWG.*

The TWG Research Assistant continued to provide GIS products to the TWG:

1.) Updated maps were created depicting locations of funded and proposed restoration projects for use in the proposal ranking process.
2.) Maps were also generated to assist in both the TWG flow study scoping and subbasin planning efforts (Figure 2).
3.) A library of Digital Orthophoto Quarter Quads (DOQQ) was assembled to provide complete coverage for the subbasins below Iron Gate Dam. These DOQQs (one meter pixel resolution ortho-rectified digital imagery) were catalogued on CD-ROM and subbasin DOQQ CD-sets were distributed to each of the subbasin planning entities. In addition, a complete copy of this image library (49 CDs) has been delivered to the USFWS Klamath River Fish and Wildlife Office and has been made available for duplication to the North Coast Geographic Information Cooperative (NCGIC) and the USFWS Arcata Field Office
4.) Additional DOQQs were obtained from the USGS for approximately one-third of the Upper Klamath Basin. These DOQQs were made available to the Bureau of Reclamations, Klamath Project and archived at the HSU Spatial Analysis Lab.
5.) A Klamath Basin ArcView project was assembled and distributed on CD-ROM to Task Force and TWG members, Subbasin Planning entities and numerous restoration program cooperators (Figure 3).

Task 2. *To continue to provide the TWG with documentation services at select TWG meetings.*

The TWG Research Assistant attended and documented all TWG meetings up until January 15, 1998 - at which point the TWG acknowledged that demands for meeting documentation were consuming a disproportionate amount of the Research Assistant's budget and moved to cease using the Research Assistant for this task. Meetings attended focused on the scoping and development of an in-stream flow study plan. In addition, the Research Assistant attended and documented meetings of the Subbasin Planning subcommittee.

Task 3. *To Assist the KRBFTF and TWG in the identification of anadromous fishery restoration priorities for FY99 funding (e.g., assembly and maintenance of the KRBFTF restoration projects database and incorporation of other restoration projects within the basin).*

The KRBFTF Restoration Projects Database was updated to include locations and information about proposed and funded projects for FY 99. Maps depicting the

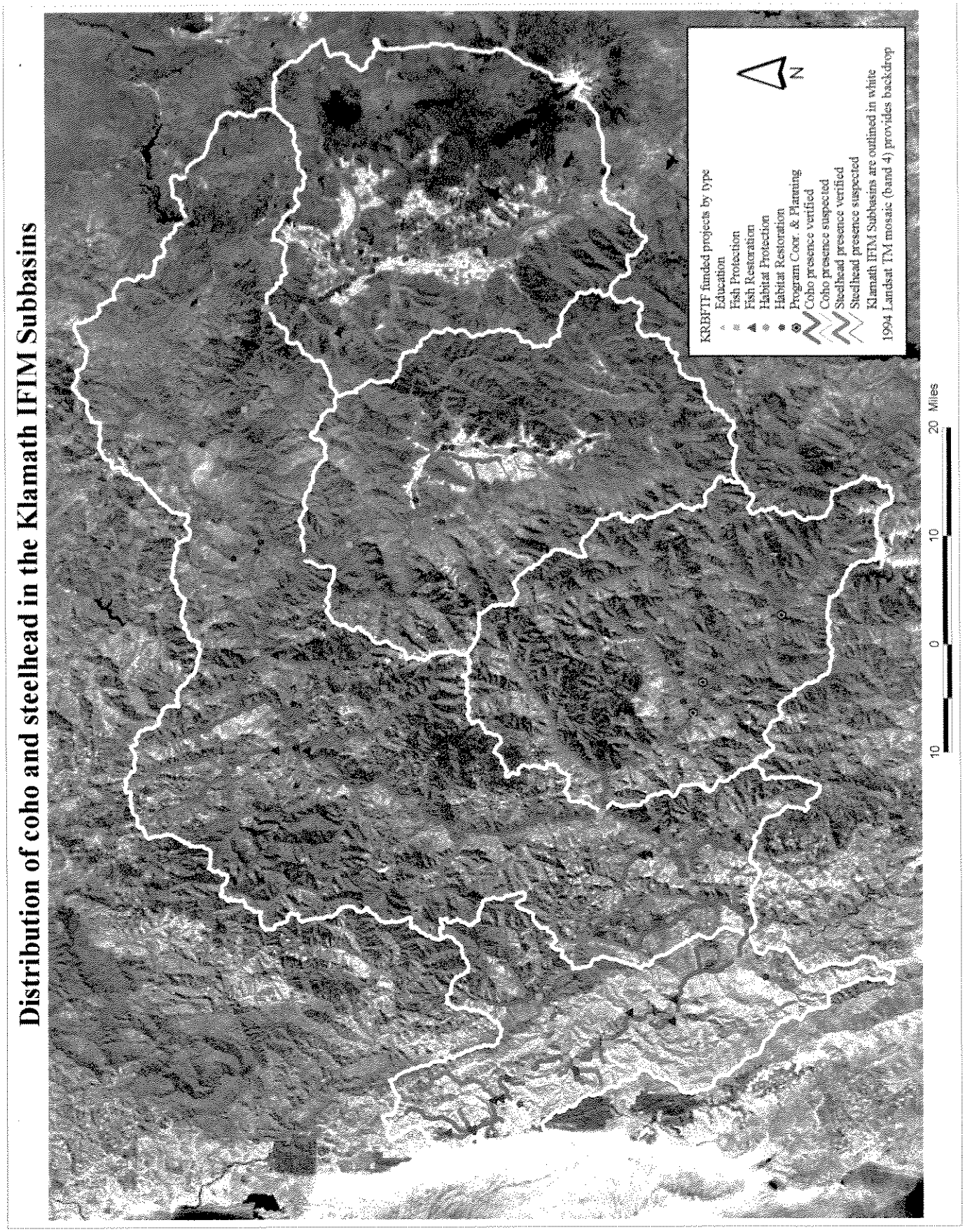


Figure 2. Distribution of coho and steelhead in the Klamath IFIM Subbasins. A sample of the maps produced in support of TWG flow study scoping efforts.

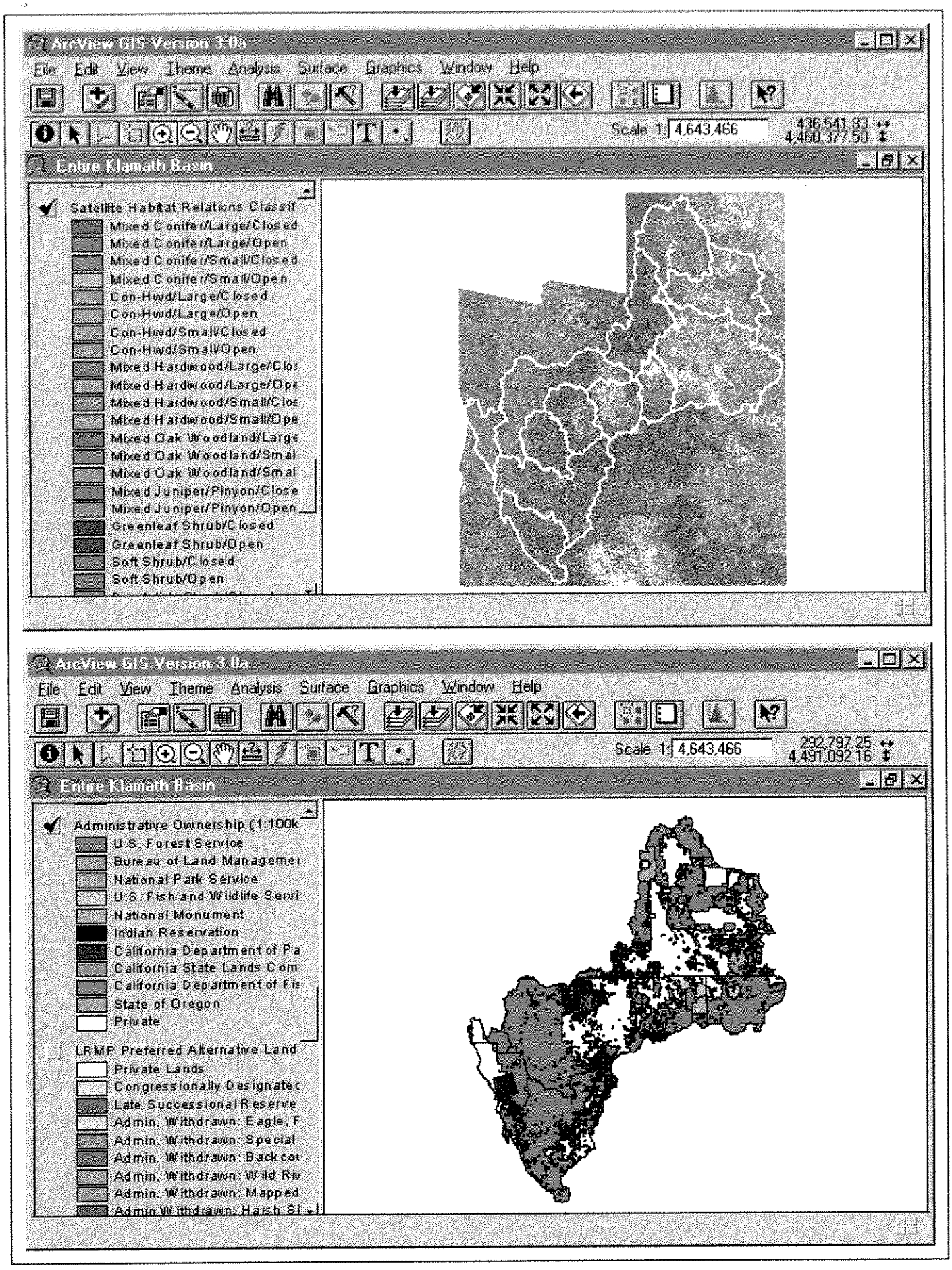


Figure 3. Sample views from the Klamath Basin ArcView™ project.

distribution of proposed and funded restoration projects were compiled and made available to TWG members for use in the annual proposal ranking process.

The KRBFTF restoration projects database was included in the Klamath Basin ArcView project (v1.1) along with the most current version of California Department of Fish and Game's fisheries restoration projects database. Having access to these data sets through desktop GIS should improve the ability of restoration program cooperators to target restoration proposals and learn from past experiences in the Klamath basin.

Task 4. *To coordinate GIS data collection and facilitate digital data transfer among GIS cooperators and end users, such as CRMP projects and, when appropriate, the Klamath Resource Information System (KRIS).*

Significant progress was made on this task via the distribution of the Klamath Basin ArcView project and DOQQs on CD-ROM. In an effort to make GIS data for the Klamath available to a broader audience and to streamline data distribution, a Spatial Data Library has been established on the internet through the Humboldt State University Spatial Analysis Lab website (http://www.humboldt.edu/~salab/sds_index.html). This website provides internet browser access to an anonymous ftp site for downloading spatial data sets in a compressed ArcInfo interchange format (Appendix A). In addition to providing regional data sets and associated metadata to restoration program cooperators and the general public, the Spatial Analysis Lab website provides information about related research projects and links to other sites of potential interest to program cooperators. See Appendix B for a comprehensive list of data transfers.

Task 5. *To support the KRBFTF, USFWS, and TWG in the development of a basin- wide restoration strategic plan and component subbasin action plans.*

This was to be the main task for the project during FY 98, however, other tasks dominated the Research Assistant's time. In order for the Task Force to make use of limited resources in an effective way, a basin-wide strategic plan and component subbasin action plans must guide it. In future years this task needs to be given adequate priority.

In FY 98 the Research Assistant continued to attend and document meetings of the TWG Subbasin Planning subcommittee. One of the main accomplishments of the subcommittee was the development of an outline for standardizing subbasin action plans (Appendix C).

Task 6. *To provide a long-range program of digital data development needs and to investigate mechanisms for the completion of the tasks.*

Through the subbasin planning and GIS subcommittees of the TWG, spatial data gaps were identified and, where possible, these gaps were filled through the distribution of available data.

In FY 98 the Task Force funded the acquisition of high-resolution multi-spectral digital imagery of the Klamath River mainstem and its major tributaries through a contract with Utah State University. The Research Assistant assisted TWG members in identifying intensive study reaches within the area of image coverage. Maps identifying the proposed intensive study reaches were provided to Utah State University to assist in the identification of ground truth areas instrumental to a proposed image classification effort.

Task 7. *To examine and analyze, using GIS and remote sensing technology, spatial, biophysical and cultural parameters affecting anadromous fishery recovery efforts.*

Data development continued this year to assist in examination of the parameters affecting anadromous fishery recovery efforts. In particular, progress was made on improving the quality of the hydrography coverage for the Shasta subbasin as part of a collaborative effort with the Shasta CRMP.

The assembly and distribution of a Klamath Basin ArcView project made relevant spatial data available to subbasin planning entities and restoration program cooperators. Included in the Klamath Basin ArcView project (v1.1) was the product of a separate effort by the Klamath Bioregional Assessment Project: a wildlife habitat map and database for the Oregon – California Klamath Bioregion derived from 1994 Landsat imagery (v1.0a). This data has been incorporated into analysis examining parameters affecting anadromous fishery recovery efforts in the bioregion. One ongoing project is assessing landscape factors surrounding landsliding and debris torrent events in the Salmon River, home to some of the last best runs of anadromous fish in the Klamath Basin. Another ongoing project aims at testing the validity of a process-driven model for mapping terrain stability hazards in the bioregion.

Task 8. *To communicate regularly with an established TWG liaison concerning the prioritization of tasks.*

The TWG Research Assistant worked closely with appointed liaisons, Bob Rohde of the Karuk Tribe of California, and James Wroble of the Hoopa Tribe. As liaisons, Rohde and Wroble provided direction to the Research Assistant concerning the prioritization of tasks. They also assisted the Research Assistant in communicating the value and relevance of GIS and remote sensing technologies to fisheries restoration planning efforts in the Klamath River Basin. To this end, Rohde and Wroble assisted the Research Assistant in the development of a presentation given to the TWG in March of 1998 (Appendix D). In addition, Rohde distributed a written status report to the Task Force in June of 1998 (on file at the USFWS Klamath River Fish and Wildlife Office).

SUMMARY AND CONCLUSIONS

The TWG Research Assistant continued to provide GIS database and mapping products to restoration program cooperators in FY 98. Emphasis was placed on supporting subbasin planning and flow study scoping efforts.

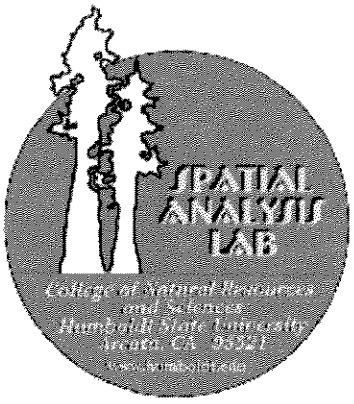
The KRBFTF restoration projects database was updated and distributed to restoration program cooperators along with the California Department of Fish and Game restoration projects database. Spatial data was compiled for the Klamath Basin and its component subbasins and distributed to cooperators in the form of an ArcView project on CD-ROM. A library of DOQQ CDs was assembled to provide full coverage for the basin below Iron Gate Dam. DOQQ CDs were catalogued by subbasin and distributed to subbasin planning entities. In an effort to streamline and expand data distribution efforts, the TWG Research Assistant has made much of the Klamath basin-wide spatial data available through the Humboldt State University Spatial Analysis Lab website (http://www.humboldt.edu/~salab/sds_index.html). The Klamath TWG GIS continues to be maintained at Humboldt State University.

There was a significant increase in TWG meeting frequency in FY 98. Acknowledging that the increased demand for documentation services was taking up a disproportionate amount of the Research Assistant's time and budget, the TWG contracted documentation services separately for FY 99. This should allow future TWG Research Assistants to better focus on providing support for subbasin planning efforts and carry out GIS and technical research projects consistent with their academic goals.

In order for the Task Force to make use of limited resources in an effective way, a basin-wide strategic plan and component subbasin action plans must guide it. Clearly, the development of such plans should be a priority in future years. It is imperative that the Technical Work Group establish clear priorities in order for future relationships with Humboldt State University students and faculty to be mutually beneficial.

Appendix A

HSU Spatial Data Library



Spatial Data Library

The HSU Spatial Data Library makes spatial data published by the lab available to the general public. Geographic data and associated tabular data are provided here in a data exchange format for use in geographical information systems for analysis and integration with other geospatial data.

Note: these data files are not directly viewable using an internet browser or image viewing tools, however, a free GIS data viewer and data importer is available from Environmental Systems Research Institute at www.esri.com/software/arcexplorer. All data sets are provided as unix compressed ArcInfo interchange files, which can be uncompressed using the 'uncompress' command on unix systems or the Winzip utility on PCs. Winzip is available free of charge from www.winzip.com.

Disclaimer

The information made available here was derived from a variety of sources. Care was taken in the creation of these themes, but they are provided "as is". The Humboldt State University Spatial Analysis Lab cannot accept responsibility for any errors, omissions, or positional accuracy in the digital data or underlying records. There are no warranties, express or implied, including the warranty of merchantability or fitness for a particular purpose, accompanying any of these products. However, notification of any errors will be appreciated.

All data sets are provided as unix compressed ArcInfo interchange files and are projected in UTM zone 10, NAD 27 - See metadata for details

Themes by Category	Source & Scale	File Size	Metadata	Geographic Extent
BOUNDARIES kbbnd Klamath Basin Boundary	CDFG & ODFW (1:100k)	177KB	kbbnd.txt	Klamath River Basin
kpbnd Klamath Province Boundary	CDFG & ODFW (1:100k)	186KB	kpbnd.txt	Klamath Province
kebnd Klamath Ecoregion Boundary	CDFG & ODFW (1:100k)	399KB	kebnd.txt	Klamath Ecoregion
kzbnd Klamath Economic Zone Boundary	CDFG & ODFW (1:100k)	385KB	kzbnd.txt	Klamath Economic Zone

CITIES kbcty_pt Klamath Basin Cities (point)	CA Teale Data Center & ESRI ArcUSA	6KB	kbcty_pt.txt	Klamath River Basin
kbcity Klamath Basin City extents (poly)	CA Teale Data Center & ODFW	183KB	kbcity.txt	Klamath River Basin
kzcty_pt Klamath Basin Cities (point)	CA Teale Data Center & ESRI ArcUSA	13KB	kzcty_pt.txt	Klamath Economic Zone
kzcity Klamath Basin City extents (poly)	CA Teale Data Center & ODFW	545KB	kzcity.txt	Klamath Economic Zone
COUNTIES kpcounty Klamath Province counties	CA Teale Data Center & ESRI ArcUSA	226KB	kpcounty.txt	Klamath Province
kzcounty Klamath Economic Zone counties	CA Teale Data Center & ESRI ArcUSA	491KB	kzcounty.txt	Klamath Economic Zone
LAKES kblak100 Klamath Basin Lakes	CA Teale Data Center & USGS (1:100k)	396KB	kblak100.txt	Klamath River Basin
kzlakes Klamath Eeconomic Zone lakes	CA Teale Data Center & USGS (1:100k)	21KB	kzlakes.txt	Klamath Economic Zone
OWNERSHIP kbown Klamath Basin Administrative Ownership	CA Teale Data Center & OR Defenders of Wildlife (1:100k)	1.2MB	kbown.txt	Klamath River Basin
kzown Klamath Economic Zone Administrative Ownership	CA Teale Data Center & OR Defenders of Wildlife (1:100k)	2.4MB	kzown.txt	Klamath Economic Zone
PLSS **(township/range/section lines)** humboldt_pls Humboldt County public land survey system grid	USGS (1:100k)	815KB	plss.txt	Humboldt County
mendo_pls Mendocino County public land survey system grid	USGS (1:100k)	894KB	plss.txt	Mendocino County

delnorte_pls Del Norte County public land survey system grid	USGS (1:100k)	187KB	plss.txt	Del Norte County
siskyou_pls Siskyou County public land survey system grid	USGS (1:100k)	1.2MB	plss.txt	Siskyou County
trinity_pls Trinity County public land survey system grid	USGS (1:100k)	819KB	plss.txt	Trinity County
lake_pls Lake County public land survey system grid	USGS (1:100k)	356KB	plss.txt	Lake County
sonoma_pls Sonoma County public land survey system grid	USGS (1:100k)	364KB	plss.txt	Trinity County
QUAD INDEX kp_q24 Klamath Province 7.5' Quad Index	HSU Generated from USGS publication (1:24k)	82KB	kp_q24.txt	Klamath Province
kp_q100 Klamath Province 1:100k Quad Index	HSU Generated from USGS publication (1:100k)	12KB	kp_q100.txt	Klamath Province
kp_q250 Klamath Province 1:250k Quad Index	HSU Generated from USGS publication (1:250k)	9KB	kp_q250.txt	Klamath Province
RESTORATION krbftf98 Klamath River Basin Fisheries Task Force (KRBFTF) Restoration Projects database (through FY98)	HSU Generated from USFWS - KRBFTF Request For Proposal (RFP) maps	KB	krbftf98.txt	Klamath River Basin
ROADS kbroads Klamath Basin Roads	CA Teale Data Center & OR SSCGIS (1:100k)	6MB	kbroads.txt	Klamath River Basin
kzroads Klamath Basin Roads	CA Teale Data Center & OR SSCGIS (1:100k)	14.8MB	kzroads.txt	Klamath Economic Zone
STREAMS kbstm100 Klamath Basin Streams	CA Teale Data Center & USGS (1:100k)	KB	kbstm100.txt	Klamath River Basin

kbstm500 Klamath Basin Streams		KB	kbstm500.txt	Klamath River Basin
kzstm100 Klamath Economic Zone Streams	CA Teale Data Center & USGS (1:100k)	6.7MB	kzstm100.txt	Klamath Economic Zone
WATERSHEDS **kbsubwsd** Klamath Basin USGS Hydrologic Units	CDFG & ODFW (1:100k)	351KB	kbsubwsd.txt	Klamath River Basin
kzsubwsd Klamath Economic Zone Basin USGS Hydrologic Units	CDFG & ODFW (1:100k)	896KB	kzsubwsd.txt	Klamath Economic Zone
tfsubwsd Klamath River Basin Fisheries Task Force (KRBFTF) Restoration Planning Subbasins	CDFG, ODFW & HSU (1:100k)	359KB	tfsubwsd.txt	Klamath River Basin

Spatial Analysis Lab
Humboldt State University
College of Natural Resources & Sciences
Arcata, CA 95521
phone: (707) 826-5417 fax: (707) 826-4145

Please email questions or comments about this site to: salab@axe.humboldt.edu

Appendix B

HSU GIS Data Transfer Log

FY 1998	HSU Spatial Analysis Lab - Data Transfer Log			
Date	**To:**	**From:**	**Description**	**media format**
10/1/97	Jennifer Silveira	Van Hare	ArcView project of entire Klamath Basin and its	(4) zip disks
	USFWS-Yreka		separate subbasins. Includes all base layers,	
			data from Klamath NF and SHR classification v1.0a	
			(Klamath ArcView project and GIS Data layers v1.0)	
10/15/97	Charles Convis Director of Conservation	Georgia Trehey	"westgrid", "eastgrid", and companion color, text, and	(1) 8mm tape
	ESRI 380 New York Street, Redlands CA		dbf files, in other words, all the classified veg	
	92373 ecp@esri.com			
10/17/97	Ron Iverson	Georgia Trehey	"westgrid", "eastgrid", and companion color, text, and	(2) zip disks
			dbf files, in other words, all the classified veg	
10/24/97	Rob Beachler	Georgia Trehey	"westgrid", " and companion color, text, and	(1) zip disks
			dbf files	
10/28/97	Chris Stermer, Yreka Fish and Game	Georgia Trehey	Accuracy assessment points from entire western grid	sent as e-mail message
	(Tim Burton)		- total points 2465	
11/1/97	Bob Rohde	Van Hare	ArcView project of entire Klamath Basin and its	(4) zip disks
	Karuk Tribe of California & TWG		separate subbasins. Includes all base layers,	
	Subbasin Planning Subcommittee Chair		data from Klamath NF and SHR classification v1.0a	
			(Klamath ArcView project and GIS Data layers v1.0)	
11/1/97	Faye Weekley	Van Hare	(1) ArcInfo point coverage built from data provided by	(1) zip disk
	KBERO - Klamath Falls, OR		Faye to represent location of on the ground watershed	(2) hardcopy maps
			restoration projects administered by the KBERO.	
			(2) Base layers (1:500k streams, Klamath TF Restoration	
			Planning Subbasins, & Klamath Province Counties &	
			boundary files) were sent along with an ArcView project	
			on zip disk.	
			(3) 2 hardcopy maps depicting KBERO administered	
			restoration projects were delivered to Curt Mullice during	
			his visit to the lab.	
			Note: this work was done as a follow up to Klamath	
			Bioregional Project - not as part of KRBFTF monies.	
11/3/97	Nadananda, Friends of the Eel River	Georgia Trehey	Kelly's Physiographic of Eel River	(2) hardcopy maps
			Curtice's 2 part pattern grid of Eel stream vectors	
11/4/97	Chris Stermer, Yreka Fish and Game	Georgia Trehey	Accuracy assessment points from entire western grid -	sent as e-mail message
	(Tim Burton)		to make a grand total of 5000 points in the file.	
11/12/97	Joe Krieter, Forest Science Project	Georgia Trehey	"westgrid", "eastgrid", and companion color, text, and	(2) zip disks
			dbf files, in other words, all the classified veg	
11/19/97	Bonnie Allison, Klamath National Forest	Georgia Trehey	"westgrid", "eastgrid", and companion color, text, and	8mm tape
			dbf files, in other words, all the classified veg	
11/19/97	Colin Brooks, GIS Program Analyst	Georgia Trehey	"westgrid", "eastgrid", and companion color, text, and	8mm tape
	Hopland Research & Extension Center		dbf files, in other words, all the classified veg	

Date	To:	From:	Description	media format
11/19/97	Diane Knox, Ukiah BLM	Georgia Trehey	"westgrid", "eastgrid", and companion color, text, and	8mm tape
			dbf files, in other words, all the classified veg	
11/24/97	Frank Davis, UCSB	Georgia Trehey	"westgrid", "eastgrid", and companion color, text, and	8mm tape
			dbf files, in other words, all the classified veg	
12/2/97	Andy Peavy, GIS Analyst, Winema	Georgia Trehey	1 GRID export file of the Williamson box clip Hue, Hue boundar	ftp
	National Forest		and Arc GRID color file (.clr)	
12/11/97	Pat Higgins	Van Hare	ArcView project of entire Klamath Basin and its	(3) zip disks
	William Kier Associates - KRIS		separate subbasins. Includes all base layers,	
			data from Klamath NF and SHR classification v1.0a	
			(Klamath ArcView project and GIS Data layers v1.0)	
12/22/97	Caryl Waggett , CHAART,	Georgia Trehey	"westgrid", "eastgrid", and companion color, text, and	8mm tape
	NASA Ames Research Center		dbf files, in other words, all the classified veg plus Erdas .img files of	
			"westgrid" and "eastgrid"	
1/10/98	Diane Torpin, GIS Librarian; Sam Cuenca,	Georgia Trehey	Elk model in GRID format	8mm tape
	supervisor-Oak Knoll Ranger District,		"westgrid", "eastgrid", and companion color, text, and	8mm tape
	Klamath National Forest, Ft. Jones, CA		dbf files, in other words, all the classified veg	
1/14/98	Diane Knox, BLM Ukiah	Georgia Trehey	map of veg classification extent, otherwise known as "Enchilada	(1) hardcopy map
1/21/98	Curt Mullis, Chief of Restoration, Klamath Eco	Georgia Trehey	map of veg classification extent, otherwise known as "Enchilada	(3) hardcopy map
	Klamath Falls, OR			
1/27/98	Nadananda, Friends of the Eel River	Georgia Trehey	.tif of Arc/Info hillshade map plus streams and 2 road vectors.	ftp
2/13/98	Leslie Reed, Geomorphologist,	Georgia Trehey	map of veg classification extent, otherwise known as	(1) hardcopy map
	Redwood Sciences Lab		Enchilada Map	
2/17/98	Curt Mullis, Chief of Restoration, Klamath Eco	Georgia Trehey	Arc/Info Upper Basin hillshade map	(5) hardcopy map
	Klamath Falls, OR			
3/17/98	Rob Beachler, Coastal Forestlands	Georgia Trehey	Downloaded 20 - 1:24000 DEM's (7.5 quads) and 4 - 1:250,000 I	(1) zip disk
			off the net.	
4/1/98	Celia Yamagiwa	Van Hare	(1) CD of Wildlife Habitat Map and Database for OR_CA Klama	(1) CD
	USFS Winema NF - Warner Mtn. Ranger District		v1.0a	
	P.O. Box 220			
	Cedarville, CA 96104			
4/1/98	Diane Knox, BLM Ukiah	Georgia Trehey	mosaic of southern counties portions of westgrid and easgrid	ftp
			and standard "finals" directory auxilary files	
			CD - of "finals" directory	CD
4/6/98	Dave Morgan, USGS	Larry Fox	"westgrid", "eastgrid", and companion color, text, and	8mm tape
			dbf files, in other words, all the classified veg	
4/9/98	Gary Emery, GIS Analyst	Larry Fox	CD - of "finals" directory and veg clip of Hoopa	CD
	Forestry Division, Natural Resources Department		Reservation	
	Hoopa Valley Tribal Council			

Date	To:	From:	Description	media format
5/15/98	Klamath TWG Subbasin Planning Members	Van Hare	Each of the members of the Subbasin Planning Subcommittee we	(6) CDs
	Dave Webb - Shasta CRMP		a CD of the Klamath ArcView project and GIS Data layers v1.1	along with
	Jim Villeponteaux - Salmon River Restoration Council		a brief demonstration of the project.	
	Lorrie Bundy - Scott River CRMP			
	Mark Pisano - CDF&G, Yreka Field Office			
	James Wroble - Hoopa Tribal Fisheries			
	Bob Rohde - Karuk Tribe of California			
5/15/98	Jennifer Silveira	Van Hare	(1) CD of the Klamath ArcView project and Data v1.1	(16) CDs
	USFWS, Klamath River Fish & Wildlife Office - Yreka		(1) CD of Wildlife Habitat Map and Database for Klamath Bioregion v1.0a	
			(1) Set of DOQQ CDs for the Scott River Subbasin (includes 9 CDs)	
			(1) Set of DOQQ CDs for the Shasta River Subbasin (5 0f 8 CDs)	
5/15/98	Dave Webb	Van Hare	(1) Set of DOQQ CDs for the Shasta River Subbasin	(5 0f 8 CDs)
	Shasta CRMP coordinator		partial coverage.	
6/1/98	Lorrie Bundy - Scott River CRMP	Van Hare	Siskiyou county plss layer and training in use of Spatial	floppy disk
			Analyst during visit to Etna.	
6/5/98	Richard Van de water for Al Olson	Van Hare	.amls and coverages necessary to reconstruct the RFP	ftp
	Klamath National Forest		map series to be used as a template for KNF basinwide	
	Fort Jones, CA		planning effort.	
			Also: kbstm100 streams coverage with annotation.	
6/15/98	Dave Webb	Van Hare	(2) working maps to support Shasta subbasin hydro	hardcopy maps
	Shasta CRMP coordinator		clean-up effort. North and South halves of Shasta subbasin.	
7/1/98	Bob Rohde	Van Hare	(1) Set of DOQQ CDs covering Middle Klamath Subbasin	(17) CDs
	Karuk Tribe of California		along with brief demonstration of Klamath ArcView project	
	Middle Klamath Subbasin Planning effort		and use of DOQQs (Scott Quinn and April Tripp)	
7/1/98	Task Force and TWG members	Van Hare	(24) GIS Status report binders, including sample maps,	(24) Report Binders
			progress report and Klamath Basin ArcView Project and	(24) CDs
			GIS Data Layers v1.1 on CD-ROM. Bob Rohde	
			distributed and gave a report to the Task Force.	
7/15/98	Jennifer Silveira	Van Hare	(1) Set of DOQQ CDs for the Middle Klamath Subbasin	(17) CDs
	USFWS - KRFWO			
	Yreka			
7/15/98	Gary Emery, GIS Analyst	Van Hare	(2) CDs of DOQQs from Six Rivers and Shasta-Trinity	(2) CDs
	Forestry Division, Natural Resources Department			
	Hoopa Valley Tribal Council			
8/1/98	Dave Webb	Van Hare	(3) CDs - completing set of DOQQs for the Shasta	(3) CDs
	Shasta CRMP Coordinator			

Date	To:	From:	Description	media format
8/15/98	Dave Webb			
	Shasta CRMP Coordinator	Van Hare	(2) working maps (revised) for the Shasta hydro clean-up	(2) hardcopy maps
			project.	(1) floppy disk
			Also: 1.) Autocad files depicting parcels linework	
			converted to shape file format.	
			2.) PLSS linework for Siskiyou county in shape file format	
8/15/98	Jennifer Silveira	Van Hare	(1) Set of CDs for the Salmon River Subbasin (8 CDs)	(18) CDs
	USFWS - KRFWO		(1) Set of CDs for the Lower Klamath Subbasin (7 CDs)	
	Yreka		Remaining 3 CDs to complete DOQQ Coverage for the	
			Shasta subbasin.	
9/1/98	Jim Villeponteaux via Will Harling	Van Hare	(1) Set of DOQQ CDs for the Salmon River Subbasin	(8) CDs
	Salmon River Restoration Council			
9/1/98	Tony O'Rourke	Van Hare	(1) Set of DOQQ CDs for the Lower Klamath Subbasin	(7) CDs
	Yurok Tribe of California		(1) Klamath Basin ArcView Project v1.1	(1) CD
			(1) Wildlife Habitat Map and Database for the OR-CA	(1) CD
			Klamath Bioregion v1.0a	
11/15/98	Dave Webb	Van Hare	4 copies of Shasta Landsat Image map to support	8 hardcopy maps
	Shasta CRMP Coordinator		subbasin planning.	
			4 copies of Shasta subbasin with ownership, roads and	
			most current version of Shasta hydro layer	

Appendix C

Approved Outline for Subbasin Action Plans

Klamath River Basin Fisheries Task Force
Subbasin Action Plan Outline
October 15, 1997

Preface: Restoration Program Information: Goals, Task Force Authority, Basin Map

I. **Introduction:** Describe subbasin planning process and why the Plan is needed; Uses of the Plan (same for all subbasins)

II. **Subbasin Introduction**

A. Background -Subbasin map; Stakeholders/resource users; cultural and resource history, etc.

B. Current Status of Watershed Conditions (Including limiting factors, data and restoration needs)

1. Geology (landslides, background geology, and geomorphology)
2. Fish (fish species, population dynamics, and fish habitat)
3. Hydrology
4. Vegetation
5. Fire
6. Land Uses (agriculture, forestry, mining, roads, ownership, dams, diversions, municipal, hydropower)
7. Wildlife
8. Urban
9. Cultural
10. Present water rights and fish protection laws (appendix?)
11. Education/Cooperation
12. Current Environmental Baseline Matrix

III. Subbasin Objectives

Integration of Background and Current Status Information (Example: On Shasta River historic records indicate >80,000 fish. Currently, 3,000. Objective: Increase fallchinook to a minimum of 5,000 over the next 5 years.)

IV. Actions

A. Matrix Description

B. Matrix Elements:

Priority Level, Project, Estimated Costs, RFP Possible, Comments

Glossary of Terms

Appendices

1. Subbasin Contacts -Interested Parties; Former Contractors; Agencies; Roles of Contacts
2. RFP Process Information
3. Other Funding Sources
4. Additional Subbasin Information Sources
5. List of Surveyed Streams -Would include information provided by cooperators i.e. types of surveys and who to contact
6. Expenditure of RFP Project Funding by Project Category
7. Pertinent Regulation Information
8. Life Histories of Fish Species
9. Work Plan (includes timeline, etc.)

Appendix D

GIS Presentation given to TWG – March 1998

Applying GIS to Anadromous Fisheries Restoration Planning in the Klamath River Basin

A Strategy for the Technical Work Group (TWG) of the Klamath River Basin Fisheries Task Force

Background:

In 1994, the Technical Work Group (TWG) of the Klamath River Basin Fisheries Task Force (KRBFTF) contracted with Humboldt State University (HSU) to assemble and develop Geographic Information System (GIS) digital data layers in support of fisheries restoration planning in the Klamath River Basin.

Basic Objectives:

- Provide GIS research and spatial data products required by the TWG
- Work with the TWG in analyzing and disseminating information related to Klamath River Basin fisheries restoration projects
- Provide general support and documentation of TWG activities, particularly subbasin planning efforts
- Coordinate transfer of GIS data layers among cooperating entities, including CRMPS

Past Progress: FY95-97

Compilation of basinwide GIS layers

- Waterbodies (1:100k)
- Watershed Boundaries: USGS HUCS & Calwater Planning Watersheds (1:100k)
- Hydrography (1:100k)
- Mines (US Bureau of mines 1:100k)
- Transportation (1:100k)
- Cities (1:100k point and polygon covers)
- County Boundaries (1:100k)

Past Progress FY95-97:

Compilation of basinwide GIS data layers

- Ownership / Administrative Units (1:100k)
- USGS Quad Indexes 1:24k, 1:100k, & 1:250k
- Public Land Survey System (Township, Range, Section lines at 1:100k)
- USGS Digital Elevation Models (DEMs) joined for Klamath Basin (90m cell size).
- KRBFTF Restoration Projects Database developed

Past Progress FY95-97:

Improving the utility of basinwide GIS data layers

- Annotation of Streams (1:100k) for the Klamath Basin Below Iron Gate Dam
- Improving attribution of River Reach Files (1:100k streams)
- Maintenance of KRBFTF Restoration Projects Database
- Composition of Subbasin Maps in support of the RFP process
- Composition of maps in support of TWG Flow Study Scoping and USGS Modeling efforts.

Conclusions from FY97 annual report

- The increase in meeting frequency has taken time away from GIS efforts
- Data development, research, and analysis efforts in support of the Restoration Program have suffered as a result
- Clear priorities need to be established by the TWG in order for them to get the most out of their relationship with HSU

Establishing priorities for FY98

Phase I:

Develop and acquire homogenous base layers in preparation for TWG modeling, GIS analysis and subbasin restoration planning

Phase II:

1.) Meet TWG IFIM, subbasin strategic planning, modeling, and other GIS needs.

2.) Distribute homogenous GIS layers at the subbasin level and provide training

Phase III:

1.) Applied TWG Restoration Planning

2.) Work with subbasins to help them meet their local GIS needs.

Phase I Tasks:

1.) Assemble readily available base layers and subset for each of the restoration planning subbasins

2.) Acquire available digital imagery (DOQQs), convert to a format that is consistent with the georeferencing standards of the existing TWG GIS database and archive on CD-ROM

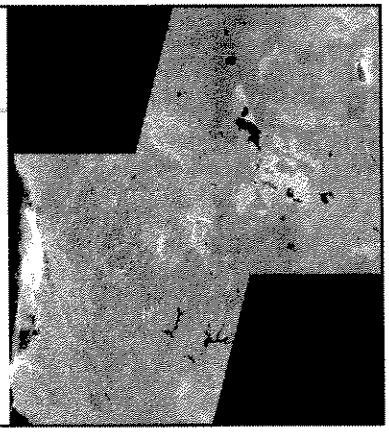
3.) Continue working to improve attribution of existing 1:100k hydrography layer for the Shasta subbasin

4.) Work to obtain or build a seamless Digital Elevation Model (DEM) for the subbasins below Iron Gate Dam (30m cell size)

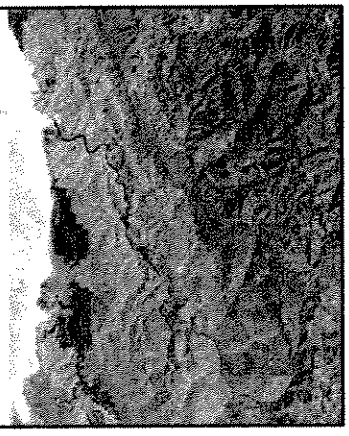
5.) Maintain and update the KRBFTF restoration projects database

6.) Devise a protocol for TWG members and cooperators to request GIS datasets and initial training

Klamath Basin Landsat TM Mosaic (1994)



Lower Klamath from Landsat



Klamath Estuary from DOQQs (Requa)